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GRADUATE SCHOOL

Thesis

THE SCIENCE CLUB IN THE JUNIOR HIGH SCHOOL

Submitted by

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(S.B Boston University, 1922)

In partial fulfilment of requirements for

the degree of Master of Arts.

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THE SCIENCE CLUB IN THE JUNIOR HIGH SCHOOL

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Outline

I. EXTRA-CURRICULAR ACTIVITIES.

a. Training for democracy

b. Need of activities.

2. BASIC PRINCIPLES SERVED BY EXTRA-CURRICULAR ACTIVITIES.

3. THE GENERAL SCIENCE CLUBS.

1. Organization of new clubs.

a. Purposes or aims of science clubs

b. Objectives

2. Constitution

a. Suggested constitution for a science club.

b. Initiation ceremony.

3. Membership

4. Meetings

a. The social meeting

b. The lecture meeting

c. Trips and excursions

d. The demonstration or work period

e. School assemblies and exhibitions

4. THE MANAGEMENT OF THE CLUB

5. ADVANTAGES RECEIVED BY SCHOOL FROM CLUBS

6. ACTIVITIES OF THE SCIENCE CLUBS

Airplane Club

Astronomy Club

Bird Club

Camera Club

Chemistry Club

Nature Study Club

Health Club

Gardening Club

Tree Club

Wild Flower Club

7. LIST OF BOOKS FOR USE IN SCIENCE CLUBS

8. BIBLIOGRAPHY

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THE SCIENCE CLUB IN THE JUNIOR HIGH SCHOOL

I. EXTRA-CURRICULAR ACTIVITIES.

a. Training for democracy.

During the World War and in the years immediately following, educators clearly foresaw the need of modern education for training the youth of this country for democracy. Democracy was the cry of the times. The answer to this cry was a challenge to the schools to prepare pupils for life in a democratic state. The schools had been inculcating knowledge of laws, and presenting ideals of good citizenship. But knowledge without practice does not make good citizens. Therefore the emphasis is being transferred to observanceof the law working towards habit formation which is acquired through continual and persistent practice. Youth must be trained for living in a democracy by obeying the laws, discharging the responsibilities and duties of a smaller democracy-- the school.

It is the duty of the school to create opportunities similar to those which will be met by the pupil in his adult life. In this way, he is given every opportunity of learning citizenship by practice in the social situations set up by the forward looking school. The opportunities created are extra-curricular activities; that is, activities not provided for in the regular curriculum or program of the school.

These activities have also been a result of the general shifting of emphasis from the subject matter to the pupil, thereby treating him as an individual with individual problems and not merely as a fraction of a group.

Clement in his "Curriculum Making in the Secondary Schools"

says that "extra-curricular activities have been defined by different groups from time to time as 'those organized activities of the pupils which are under the supervision of school authorities but are not included in the formal curriculum'".

b. Need of activities.

Man is essentially social by nature. How much more is the child. All the child's activities, at this age, are functioning to satisfy his desires for gregariousness, loyalty, rivalry, play, curiosity,etc. His development depends upon his proper relations to his companions. # Sisson in his "Essentials of Character" says in this connection, that,"Power arises, as we have seen, from secret sources in body and soul, and manifests itself in the form of impulses, instincts, desires, and other original tendencies; these powers spring up throughout life and in all periods, but are especially interesting and important in childhood and youth, as they are then the prophecy and description of life's possibilities. The first great maxim of education is the nurture and conservation of these sources of power. Repression, even when necessary, as it sometimes is, in itself is an evil, a negative and depressing factor; it is justified only when the reduction and loss in the impulse repressed is more than recompensed by enlarged scope and prosperity in some other perhaps more valuable element. Only when a particular element threatens either some other indispensable element or the balance and harmony of the whole soul, must it be pruned or eliminated."

John A. Clement "Curriculum Making in the Secondary Schools" Pp.470-492

#Edward O. Sisson "The Essentials of Character"

The adolescent's craving for activity must be met by wholesome occupation and diversion that will make use of his unexpended energy, and carry on to his leisure time. It is inevitable that if he has nothing to do that is worth doing in the way of healthy activity, he may devise activities that are harmful and injurious. The community or neighborhood "gang" oftentimes is a medium through which the adolescent finds expression. This "gang" if left unmolested frequently develops into a vicious and mischievous element. The school should eliminate this lawless element by filling the child's life with good, healthy, wholesome, and interesting activities.

2. BASIC PRINCIPLES SERVED BY EXTRA-CURRICULAR ACTIVITIES.

The advantages resulting from extra-curricular activities are numerous. Pupils who feel that they have a part in "running" an organization, or even those who aid in building up a club, have an added interest in the school. This tends to retain in school many who might otherwise leave a year or two sooner. Club activities, like athletics, tend to keep boys and girls in school for a longer duration of time because of this enrichment in the curriculum.

Another advantage is that pupils become self-directive, that is, they gain self-control and dependability. In directing the club affairs, pupils are working for the common good of the whole group forgetting personal preferences. This results in a mastery of themselves which cannot fail to bring good results in later life. Self-direction develops initiation, cooperation, leadership, and fair play.

Club activities because they are so varied have an avocational advantage in that they may lead to an adult choice of leisure time occupation. Certainly, if knowledge acquired in the regular school work prepares one for the serious business of life, activities carried on in the extra-curricular period prepare one for recreation and amusement for one's spare time. Many a life-time hobby may be started in this way.

In the same way, many vocations have been possible because of student participation in club activities. In this connection we have the boys and girls who choose work involving music because of their great interest in the Orchestra or the Glee Club; or the boys who go into the Radio business because of their participation in the Radio Club; the boy who chooses the electrical line because his interest was aroused in the Edison Club. No doubt, there are innumerable cases of this kind.

The activities make it possible for a more natural relation between teacher and pupil. No matter how much a teacher may strive to make the atmosphere of the school-room natural and easy, there is bound to be a certain amount of restraint. This is all done away with in the club period. The pupils here will talk freely, asking many questions, and treat the teacher as a fellow human being. They lose all self-restraint and self-consciousness. The teacher should be a helpful sympathizer and guide.

It has been proven that extra-curricular activities generally lift the morale and the scholarship of a school. The pupils assume a gra ater degree of individual responsibility toward their work and environment, they take greater interest in their studies with the result that they get better marks. Principals

have reported that marks have improved steadily with the introduction of club activities.

These activities also motivate the regular work of the school. The larger part of the activities grow out of the curriculum. The clubs in most cases are linked up with a corresponding subject of the program such as English, Latin, History, etc. The science club is a direct result of the enthusiasm aroused by the work in science, but the teaching period in turn is enriched by the activities carried on in the club. The same is true of other clubs. Thus the activities enrich the curriculum, and supplement the curricular work.

In addition, the extra-curricular activities serve as an outlet for youthful energy, bring the community in contact with the school, and give educational opportunities not possible in the curricula.

3. THE GENERAL SCIENCE CLUBS.

The science club has originated in various ways. Commonly, it has been the result of the great interest aroused in some branch of science in the teaching period. Since this interest cannot be worked out and investigated in detail during school time for obvious reasons, it is delegated to the activities period. For instance, through a superficial study of photography, such an interest is aroused that a photography club is established. The immense value is in the fact that the initial movement comes from the pupils and not from the teacher.

As a result, a general science club may meet the need for further investigation. When the students want to spend all their

activities time investigating one division in science, a specialized club is established. These are the Radio Clubs, Tree Clubs, Bird Clubs, etc.

Sometimes the science club has come into existence through the intense interest which pupils have taken in their chemical toys and scientific play material such as the "Chemcraft Sets", "Erector Sets", "Mineralogy Sets", "Experiments with Light", "Magnetism, Water, Air Sets", or other play objects. The toy manufacturers have organized elaborate clubs with a program of activities awarding prizes and diplomas after the completion of a definite number of experiments. Naturally, this has found its way into the schoolroom especially in the science department. In answer to this great interest, the science club is established in order to guide, feed, and develop the inherent curiosity of the child. Here questions about their scientific sets and scientific phenomena may be freely asked, new inventions and discoveries may be discussed, and experiments may be performed under expert guidance. Observation is directed along important channels, and dangers resulting from unwise use of chemicals is averted.

The science clubs in many instances group themselves about a specialized interest. This is particularly so in the comparatively large intermediate school where duplication is avoided, and where variety in clubs is an absolute necessity in order that a majority of pupils may be attracted. These specialized clubs are named as follows:

Chemistry Clubs

Radio Clubs

Bird Clubs

Electrical Clubs

First Aid Clubs

Kodak Clubs

Geography Clubs.

Astronomy Clubs

Geology Clubs

Machinery Clubs

Mechanic Clubs

Wild Flower Clubs

Animal Clubs

Photography Clubs

Field Trip Clubs

Zoology Clubs

Wireless Clubs

Camera Clubs

Agriculture Clubs

Pastrue Clubs

Airplane Clubs

Gardening Clubs

Health Clubs

Nature Study Clubs

Tree Clubs

There are other organizations that come under this group and which are named for outstanding men of science such as the Edison Club, the Marconi Club, the Audubon Club, etc. There are others that have Greek letter names.

The greater the variety and number of the clubs, the

better the opportunity for exploring, developing, and increasing the interests of the pupils.

I. Organization of new clubs.

The prime movement for any organization in a school should originate with the pupils themselves. This holds true in the organization of the science club. The pupils must feel the need for these activities. Only in this way is it possible to make the clubs of vital interest to the pupils, and consequently attain some measure of success. Extra-curricular activities that are forced upon pupils and are in any way made compulsory do not attain the greatest popularity. On the other hand, if they are made attractive and varied, they will hold sufficient appeal for the majority. Those pupils who do not fit in any activity because they do not choose to join or because they have lost their membership for any reason, may spend their time in study class-rooms until they find an activity that dictinctly appeals to them, or until they regain their membership.

Interest in the organization may be aroused in many ways. Reports of interesting meetings may be posted in a conspicuous place on the bulletin board with an attractive program for the year. Invitations may be obtained to attend meetings in other intermediate schools, or accounts of club activities of these schools may be used to arouse interest.

When a group of pupils desires to form a new science club, it submits a statement of the purposes and plans to the faculty committee on pupil affairs. If the committee votes favorably the club is organized with the help of a faculty member assigned by the principal. As soon as the new club has decided what the program of activities for the year shall be, it

submits an application for a charter to the council. The charter is formally granted by the council composed of three representatives from the student body, three members of the faculty, and the principal. The student representatives are chosen from each of the three classes. This action by the council is necessary in order that duplications may be avoided, undesirable activities may be tactfully discouraged, and activities made to conform to the policies of the school.

The club must be planned very carefully before formal application is made to the council. The following questions are settled by the pupils before making application for the charter.

What is the name of the club?

What are the aims or purposes of the club?

Time of meeting?

Place of meeting?

How often shall meetings be held?

Who may belong to the club? Are they to be initiated?

Activities and programs for the year?

What meetings are to be purely social?

What meetings are to have outside lecturers?

What meetings are to be work periods?

How many meetings a year are to be set aside for trips and visits?

When shall elections be held? How many times a year?

When these questions have been satisfactorily answered the application for a charter is made.

a. Purposes or aims of the science clubs.

To arouse interest in science.

To provide extra activities for pupils who are especially capable.

To create social contacts between teachers and pupils.

To train for leadership and democracy through participation in the legislative and executive work connected with club management.

To discover individual tastes and aptitudes which may lead to a wise choice of a life work.

To arouse community interest in science.

To supply the means by which leisure time may be profitably enjoyed through the study of natural phenomena.

To study subjects that are of great interest to the pupils, but for which there is no time in the regular science period.

To provide additional coaching for pupils who are failing in science for any reason.

To lead the pupils to appreciate the beauties of the world about them.

To give the pupils the ability to present science clearly to a non-technical audience.

To discourage false and superstitious beliefs by greater knowledge of natural laws and by scientific thinking.

To keep pupils in school longer by supplying an activity which gives pleasure and enjoyment.

To give greater opportunity for self-expression than is possible in crowded classes.

b. Objectives.

To encourage scientific knowledge.

To make the teaching period more interesting because of the club work.

To encourage higher scholarship in science.

To have every member take an active part in the meeting by the presentation of topics or by the discussion of interesting scientific facts, by performing experiments, or by demonstrating experiments previously performed at home.

To make science learning interesting.

To develop leadership, initiation, and self-reliance in science.

To appreciate the importance of science in the life of every individual.

To supply the foundation for future science study.

2. Constitution

Every club should have a Constitution if only to supply dignity to the organization. A constitution is a study of the club by the members and the sponsor. Therefore, a new one should be made every year. After it has been voted upon and adopted by a majority vote, it is pasted in the secretary's book.

The constitution sets forth the aims or purposes of the club, name, requirements for membership, where and when meetings shall be held, what dues shall be paid and what use shall be made of them, what the program of activities shall be and who shall be responsible for their arrangement. Also, it shall set forth the eligibility of officers, the number to be elected, time and frequency of elections, and the duties of each officer.

The constitution is based on an outline such as the following:

Article I. Name

Article 2. Purpose of organization

Article 3. Membership

Article 4. Duties of officers; of committees.

Article 5. Meetings

Article 6. Dues

Article 7. Activities.

a. Suggested Constitution for a Science Club.

Article I. The name of the club shall be (name).

Article 2. The aim and purpose of the club (any of those given under aims and purposes).

Article 3. Requirements for membership shall be as follows:
Any pupil in the seventh, eighth, or ninth grades who has taken at least one course in science and

has received a passing grade.

Article 4. The officers of the club shall be a president, a vice president, a secretary, a treasurer, and a librarian.

Article 5. Duties of officers.

President: He shall preside at all meetings, have all program activities approved by the faculty sponsors, and appoint all committees.

Vice-president: He shall preside at meetings during the absence of the president he shall make a record of any demonstrations given by club members.

Treasurer: He shall collect all dues, keep all accounts in good order, and be ready at a moment's notice to make a brief report of all funds on hand.

Secretary: He conducts all business correspondence for the club, keeps a record of all meetings, writes out all visits in detail, and reads these reports at the regular meetings.

The Librarian: He buys all scientific magazines and books as ordered, has charge of all club books and other reading materia that the club owns, and keeps a record of books borrowed by the club members.

Committees: All committees are chosen by the preside

Trip committee:

Locates interesting places for the club to visit, makes all necessary arrangements for these visits, prepares a set of questions before each lecture or visit in order that the speaker or guide may select talks that are of vital interest to the members.

Demonstration committee:

Prepares all equipment and apparatus, and puts the same away after all demonstration and work periods.

Article 6. Meetings shall be held once each week on the last period on Friday. They shall take place in the general science laboratory.

Article 7. Dues shall be levied by vote and at the discretion of the members, and are not to exceed twenty-five cents a month. They shall be used to purchase any equipment or reading matter that the club may require, pay for all expenses incurred by the club.

Article 8. Program activities:

There shall be a combination demonstration and work period, a lecture, a trip, and a general discussion period every month. Social meetings may be substituted for any of these at the discretion of the president and the sponsor. In addition to these, there shall be social meetings at Christmas, and at the closing meeting of the year.

b. Initiation Ceremony.

An initiation ceremony is used in installing new members that the club may have dignity and standing. The following procedure is simple yet effective in making an impression on new members.

The vice-president leads the new members to the president, reads their names, asks their reasons for joining the club. If the answers are satisfactory, the members take the following pledge:

> "I (name) do solemnly and sincerely pledge myself to defend the truth as I see it; to serve the best interests of American democracy; to perform faithfully any and all duties entrusted to me by this or any other organization in the best interests of science".

The initiation ceremony is followed by a social period, by a speaker, or by a film on some phase of science.

3. Membership.

Science clubs should not be so large that they become unwieldy. The membership should be limited to an average of thirty members in order to insure equal opportunity for self-expression. Every member should obtain the valuable experience which comes from handling the tools of science experimentation. The pupils participate by doing.

If it is found that there is danger of too many joining

Louis A. Astell School, Science and Mathematics, Oct. I928
Edisonian Science Club, Pp. 496-50I

an organization, the membership can be limited. One way is the requirement of a particular science course, that is, a definite number of points in science. Another way is to open the membership to members of one class only, such as the ninth grade, or to confer membership on those who maintain a grade of A or B in their science courses. Thus the club acts as an incentive for higher scholarship and as a reward to those pupils who do superior work.

However the matter of membership must be decided in each school according to local conditions such as size of school, courses offered in science; whether clubs are compulsory or a matter of choice, and finally whether the time of meeting is such that a smaller number will attend. In rural communities, club meetings held after school hours are generally poorly attended because pupils have a longer distance to travel home.

Each student should be allowed to choose his own activity. Where the clubs are already established, a list of such clubs should be in the hands of the pupils. The pupils will then state their preferences on paper. So that all may be accommodated, three choices in the order of preference are allowed. In every case, first choice is granted unless the club has sufficient numbers. Then the pupil is placed in the club of his second choice.

4. Meetings.

Meetings should take place in the school building where the principal can supervise all the activities. With his permission, arrangements are made for field trips and visits, and where necessary, for an occasional meeting at the home of a member. However, all meetings must be attended by the sponsor or the director in charge.

The time of meetings should be during school hours for many reasons. These are a few;

More pupils will take part.

Pupils will cooperate in a better spirit.

Pupils who are employed after school hours are not deprived of activities.

Parents will not resent the extra time demanded after school hours.

Pupils may attend competing sports and entertainments without absenting themselves from the club.

Teachers will cooperate in a better spirit since they do not give of their free time.

Club membership cannot be made obligatory.

The meetings may take the form of business, social, lecture, demonstration, work period, trips and visits, and exhibition meetings given before the whole school.

The first fifteen minutes of each period are given over to business matters such as reading of the secretary's report, discussion and approval of plans for the next trip, reports of the librarian, reports of other committees, voting on the applications of pupils who desire to join the organization, and other matters of similar nature. All

club procedure is parliamentary.

a. The Social Meeting:

This type of meeting more than the others makes for solidarity of the group, inasmuch as the members become better acquainted with the faculty, advisors, and with one another. The members have an opportunity to discuss club matters informally and at their ease. Moreover, the foundations for social poise and graciousness, for exchange of ideas without the self-consciousness all too common at this age, are laid at functions of this sort. The social meeting supplies important qualities needed in adult life.

The social meeting is held as often as the members and the sponsor vote for it. It may take the form of a get-together, or may be a more elaborate affair where the gifted members display their talents for the entertainment of the group. Once a year a large party for the alumni and one for the parents may be held. The members take complete charge of their guests, entertain them, and serve refreshments.

b. The Lecture Meeting.

The lectures may be given by a former member or graduate of the school, by former science teachers, by professors of science from neighboring educational institutions, by men and women whose daily work is in some way connected with science, by the director of the club, or by the members themselves. The secretary sends out the invitation at

least two weeks before the talk is scheduled to take place. If the invitation is accepted, a list of questions is prepared for the speaker's benefit. These are based on the information that the members desire.

c. Trips and excursions.

These are arranged by the trip committee, and are taken to a plant or factory, to a park or field, to a zoological garden, or to a museum. The committee makes investigations before-hand, obtains permission for the visit if it is required, and makes all necessary arrangements. Members take note-books with them on all field excursions.

It is an easy matter to get permission to visit a factory. School children are always welcome if they are accompanied by a faculty member or by a principal.

D. The Demonstration or Work Period.

This period is used by the members to demonstrate any device or invention which they have completed outside of school. Questions are asked by the pupils regarding the workability of inventions . If all these are answered satisfactorily and the invention actually works, points may be awarded toward a final prize. The prize is awarded by the sponsor to the pupil who receives the greatest number of points.

This period may also be used by the sponsor in performing experiments, or in supervising the members who try out their ideas by experimentation. It may also be used in the construction of apparatus for future experiments either in the club or in the teach-

ing period.

e. School Assemblies and Exhibitions.

Exhibitions are given in the school hall or Auditorium. Members perform and explain experiments which they have previously worked out in the demonstration period, or they show their workable inventions and give a clear explanation of the principles involved and how these inventions work.

Occasionally, a science play which has been written by the club members at any of the meetings, is presented to the whole school.

Nature specimens collected by the members on their field trips supply a number of interesting talks and exhibits for use in the school assembly. Lantern slides are another means of illustrating a talk prepared wholly by the pupils.

The specialized clubs have here an excellent opportunity of exhibiting the projects worked out in their clubs. Thus, the Radio Club demonstrates the wireless set or the radio made by the pupils, the Camera Club exhibits the camera or the telescope, the First Aid Club gives a demonstration of First Aid in an emergency, the Chemistry Club performs experiments or shows the products made, the Bird Club shows the bird houses, the Geology Club prepares a collection of rocks and ores, the Electrical Club demonstrates the electrical appliances made and repaired,etc.

4. THE MANAGEMENT OF THE CLUB.

The success of the club depends on the faculty advisor

or sponsor. The qualities necessary in a director are much the same as those of a good teacher; namely, sympathy, sincerity, fairness, and popularity with young people. The teacher of science is the logical choice for this position, although another teacher in another department might make a success because of an intense interest in science.

The director of a club is chosen by the principal or by the principal and a committee of pupils. Rarely is he or she chosen by the pupils alone. Briggs says that "experience shows that when pupils choose their own faculty adviser, it presents difficulties. A teacher who might be very popular with the pupils would be in great demand as a sponsor and one of the following undesirable situations might arise; overwork on the part of certain teachers, a feeling of 'slight' or discrimination on the part of the pupils who were unable to secure their choice and finally some teachers would be debarred from an opportunity to develop a skill which more and more will be demanded of Junior High School teachers. Then, too, a teacher might lack sufficient disciplinary or executive ability to direct successfully an extra-curricular activity".

"The principal, having a wider outlook and a knowledge of the limitations and aptitudes of his teachers is a better judge of the proper teachers to act as sponsors. Therefore, in the interests of economy, even distribution of time, and opportunity of work, and the articulation of the various activities with the whole program of the school, it would seem wise that the principal appoint all sponsors of such organizations".

Briggs,T.H. Extra-Curricular Activities in the Junior High Schoo
Educational Administration and Supervision
January 1923 Pp I-8

Above all, the advisor should not interfere in the election of officers. It is a valuable lesson in citizenship for pupils to realize that officers elected because of popularity are sometime inefficient.

The sponsor should not attempt to manage the club other than to offer advice and guidance except in cases where the club is actually failing. He or she may feel that the program will be a failure unless he or she personally takes charge of matters, prepares the schedule, and manages everything. While this insures a perfect meeting, it deprives the children of much valuable experience in legislation and management, thus destroying one motive for the existence of the organization. Pupil management under the supervision of the advisor makes for harmony and the ultimate success of the club.

" It is easier to lead a club than to teach. Club leaders can with greater safety confess ignorance on some subjects and work together with boys in the solution of the problem".

5. ADVANTAGES RECEIVED BY SCHOOL FROM CLUBS

The school receives many advantages from the science organizations. Some are listed below:

I. Better understanding between club members and the faculty.

2. Greater opportunity for guidance work through the clubs.

3. Aids in making science teaching more effective through the interest aroused by the club.

4. Clubs supplement the work of the science department.

5. They take complete charge of the School Assembly several times a year.

Briggs- Extra-Curricular Activities in the Junior High School
Educational Administration and Supervision-Jan. 1923

6. Club members act as assistants in all science laboratories.
7. Clubs raise the morale of the school by promoting better scholarship.
8. Discipline is made very much easier.
9. Individual responsibility is increased resulting in greater self-reliance on the part of the pupils.

6. ACTIVITIES OF THE SCIENCE CLUBS.

These may be worked out by the members themselves under the guidance of the director of the club.

Make a small fire extinquisher using vinegar and soda.

Learn the Morse code, and practise sending and receiving messages.

Set up a wireless apparatus connecting several rooms. Pupils send messages from one room to another.

Construct a simple radio for use in the school.

Construct a small broadcasting station in order to study how radio waves are produced and transmitted.

Construct a small pin-hole camera, learn to use it; learn how to develop and print pictures.

Snap and develop pictures of birds and animals.

Snap pictures of natural scenery; develop these during the club period.

Make a collection of leaves and flowers; mount and label them.

Make a collection of moths and butterflies. Identify them. Be able to tell something of their life histories.

Make a collection of stone and minerals.

Make a collection of different kinds of wood. Learn the particular uses of each kind.

Construct an airplane that will fly.

Make a lift pump.

Make a kite that will fly.

Make a sailboat that will sail.

Make cardboard maps of stars and planets that can be illuminated with electric lights.

Be able to identify ten constellations.

Learn how to patch and vulcanize the inner tube of an automobile tire.

With the use of iodine, find which of the common foods contain starch. Also test for sugar.

Construct a house thermometer.

Learn how to install an electric bell.

Make a weather vane and set it up.

Learn how to run a toy steam engine. Discuss its evolution from the first toy engine.

Make a siphon and demonstrate it.

Make a small fireless cooker. Prepare a meal in it.

Study the vacuum cleaner, and be able to show how it works.

Learn how to use a soldering outfit.

Study currents in a refrigerator.

Learn how to read a gas meter. Figure the cost of gas for a month.

Learn how the electric meter works and how to read it.

Make an electric magnet that will work.

Study the motor or dynamo. Tell how they work.

Construct a toy that demonstrates the principle of the submarine. Trace the development of the submarine showing its use in the Revolutionary War and in the Civil War. Describe the Holland type. Discuss the use of the submarine in the World War, and at the present time.

Show how fires were started from the earliest times to the present. Make fire sets to demonstrate how Indians made fire, how the Eskimo makes his fire, how the colonists made theirs. Show how fire may be made with flint and steel, also with a glass lens.

Show how the cigarette and gas lighters work.

Give the history of the match. Make a match in the laboratory. Tell how the modern matches and safety matches are made.

Make a simple musical instrument and use it.

Make soap for laundry use; make perfumed soap.

Make blue prints of the magnetic field.

Build nesting boxes for several kinds of birds. Explain their nesting habits by the type of box used.

Make simple electrical cells. Explain the chemistry of each one.

Find under what conditions air contains fewest bacteria by the use of cultures in Petri dishes.

Make a simple fly trap that will work. Keep a record of the number of flies caught within a week.

Set up a simple telephone system using a transmitter and a receiver, or using two tin cans. Study the local telephone system by visiting the central telephone office.

Study the electric bell, and tell how the ringing is produced.

Show by experiment the two ways of purifying water for drinking purposes. Make a map of the Metropolitan Water System, and trace the water supply from the reservoir to your home.

Construct a telegraph sending set.

Make a report for discussion of the way in which mail (incoming and outgoing) is handled at the postoffice.

Make a map of the local region showing the principal railroads, water transportation routes, and main automobile highways.

Make a sample collection of woolen materials, of cotton materials, and of silk materials. Test samples of goods to determine the presence of cotton. Do the same with silks.

Make a list of all furs used for wearing purposes. Obtain samples of each. Show by illustration, the animal that supplies each particular kind of fur. Make a map showing the locality where the animal is found.

Make a collection of samples of wall paper for a six room house. Show why each sample may be used for one particular room.

Make a collection of the most common beetles. Give short life history of each. Be able to give the poisons used for their destruction. Tell which are harmful and which are beneficial to man.

Make a collection of insects that are injurious to plants. Give a poison that will destroy each one.

Make a poster showing the three classes of foods: proteins, carbohydrates, and fats.

Make a poster showing foods rich in the vitamines A,B,C,D,and E.

Make a list of plants suitable for indoor cultivation. Make a list suitable for school-room growth.

Make a poster showing the steam heating system in a six room house. Show position of furnace, radiators, and pipes. Do the same for a hot water system.

Make a poster of the hot air heating system in a six room house.

Collect samples of soils obtainable in the neighborhood. Test them for acidity. Be able to tell what crops would grow best in each sample of soil.

Make an aquarium.

Make diagrams of experiments suitable for board use for the teacher of science.

Make cement and concrete.

Show how eggs may be preserved in water glass.

Make some table salt in the laboratory.

Study the biographies of great men of science such as James Watt, Walter Reed, Robert Fulton, Thomas Edison, Louis Pasteur,etc.

Make a club report of any interesting vital discovery, invention or experiment read in current science literature.

Prepare a list of questions on science to test the knowledge of the club during the question hour.

Make a report of your summer activities in science.

Plan and publish a science publication containing interesting articles in non-technical terms, home experiments,simple inventions by club members, scientific jokes, reports of club meetings, visits and trips.

What Activities Are Worth-while.

Clement says of activities, " Any activity with an avocational, a recreational, a social service, a civic, a moral, a vocational, or any other educational value in adolescent training. Any activity which will teach pupils 'to do better the desirable activities that they will perform anyway'. Any activity which will assure 'so much of good to do that the bad can not creep in'. Any activity in school hours which will replace the pursuit of a harmful outside activity. The substitution of a wholesome activity must accompany the denial of the gratification of an unwholesome activity. Any activity for the adolescent youth which has the sanction of accepted adult practice in avocational pursuits. School club is both motivation and training for adult choice of leisure time occupation."

Clement, J.A. Curriculum Making in the Secondary School

AIRPLANE CLUB

Purpose:

To arouse an interest in aviation.

To acquaint the pupils with the history and development of the airplane.

To know something of the men who made aviation what it is today.

To get an understanding of the principles of aeronautics.

Activities:

Discussion of early attempts to fly comparing the airplane then and now.

Study of contribution to aviation by Lillienthal, Chanute, Langley, the Wright brothers, Curtiss,etc.

Reading accounts of epoch making flights such as Colonel Lindburg's and other modern flights.

Reading books on flying, and making reports to the club.

Make a model of an aeroplane and of a glider.

Study dirigibles and the gases used in them.

Discussion of sustained flights, refueling in the air; of parts of ships such as fuselage, pontoons, rudder, wings, undercarriage.

Discussion of the construction of the aeroplane.

Visit to the nearest airdrome, the field, the hangar, and the shops.

Discussion of the airplane's place in the World War.

Discussion of the airplane's place in commerce and industry

Discussion of air mail service; make a map showing the established air mail routes.

Astronomy Club

Purpose:

To awaken pupils to appreciation of the beauties in the heavens above.

To give instruction of the solar system, of the stars and planets.

To increase interest in the constellations by reading the myths connected with them.

Activities:

To locate the prominent constellations for each month.

To look for meteor showers, and study the causes.

To learn the constellations and their location in the heavens.

To give a talk on meteors and their origin.

To study the history of the science of astronomy.

To read the mythe and stories that are connected with the stars.

To make star maps showing the relative positions of the stars.

To study the principles of physics involved in the telescope.

To construct a simple reflecting and refracting telescope.

To study the life of Galileo, especially his efforts in the line of astronomy.

To prepare questions on astronomy for the question box.

To make a study of the constellations showing their relative positions to the North Star and to the Big Bear.

Make a study of shooting stars, satellites, nebulae, clusters of stars, and the Milky Way.

To identify Mercury, Venus, Mars, Jupiter, and Saturn.

To study the apparent path of the sun through the sky.

Bird Club

Aims:

To enrich children's lives by acquainting them with the birds common to the locality.

To study their haunts, habits, colorings, calls, and songs.

To protect birds.

To attract birds around the school, in the parks, and around the home.

To subscribe for current bird literature.

Activities:

To study bird pests and their control.

To exchange experiences relating to birds.

To make a study of game birds, their habits, nesting and migration.

To take outdoor excursions to study birds in their natural haunts.

In spring, make a study of early arrivals such as bluebirds, robins, grackles, winged blackbird etc.

In summer, make a study of the later arrivals such as the warblers, cuckoos, goldfinches, etc.

In January and February, study the winter birds such as the sparrows, starlings, etc.

Collect abandoned nests for purposes of study.

Collect newspaper reports of birds for the purpose of reading these to the club.

Make several bird books for sick children.

To note changes in birds during nesting periods: coloration, habits and song.

To be able to imitate the more characteristic calls of the more common varieties.

To build bird houses of various types.

To prepare feeding stations for birds.

To keep a bird identification list.

To make visits to bird sanctuaries.

To study the bird leaflets issued by adult bird societies.

To read and report articles on bird lore found in books or magazines.

To conduct contests on recognition and identification of birds from pictures.

To give talks in the assembly period stressing the value of birds to man in order to arouse interest in their protection.

Preparation of articles and reports of club activities for publication in the school magazine.

CAMERA CLUB

Purpose:

To teach pupils how to take and develop better pictures.
To develop in pupils a sense of beauty and proportion in the art of photography by comparing their products with those of experienced photographers.
To teach the process of finishing, printing, and mounting pictures.

Activities:

To study the history and development of photography.
To understand something of the chemistry of photography.
To take pictures of beautiful objects around school and home grounds and in the community; pictures of trees, rivers, still water, churches, and public buildings.
To take pictures of interiors of churches, rooms, etc.
To be able to develop and print pictures in a dark room.
To construct a camera for enlarging pictures using rectilinear lens and condenser.
To be able to enlarge pictures.
To study properties of photographing chemicals.
To study science of light and color in its relation to photography.
To study the subject of lantern slide making.
To study box, folding, and portrait cameras.
To study lenses and their uses.

THE CHEMISTRY CLUB

Aims:

To arouse interest in chemistry by instruction on underlying principles of chemistry.

To give pupils the opportunity of discovering fundamental truths by performing experiments themselves.

To stimulate interest in articles relating to chemistry.

To acquaint pupils with use of apparatus.

To make use of "Chemcraft Sets" owned by pupils.

Activities:

Discussion of newspaper and magazine articles pertaining to new discoveries.

Talks by club sponsors.

Discuss how silk is made artificially; how synthetic foods are made.

Make scrapbooks with important clippings and illustrations.

Make a study of the history of chemistry.

Read about men who have made notable contributions in this field, such as Priestley, Faraday, Galileo, Lavoisier, Dewar, Moissan,etc.

Study the Bunsen burner. Study the candle flame.

Discuss the practical uses of chemistry in industry. In mining, farming, transportation,etc.

Attend lectures in nearby educational institutions.

Study of dyes, mineral and vegetable; their effect upon industry.

To perform simple experiments such as the following:

Making of oxygen, testing of oxygen.

Test several samples of foods for protein content, fat content, carbohydrate content. Also for starch, sugar, nitrogen, and mineral matter.

Make a weather forecaster for use in the home using linen and cobalt chloride.

Make a home-made barometer.

Make ammonia and study its uses.

Make crystals of alum, copper sulphate, sodium chloride,etc.

Make carbon dioxide and test it with limewater.

Perform the experiment on the decomposition of water.

Make liquid blueing from iron rust. Test samples of the commercial products.

Bleach faded materials white, and dye them with colors.

Show the effect of common acids and alkalies on cotton and wool, and on kitchen utensils.

Nature Study Club

Aims:

To inspire love of nature by arousing interest in the great out-of-doors, and by knowledge of nature's laws.

To encourage living out-of-doors.

To study plant and animal life.

To secure an understanding of life functions.

Activities:

Reports by members of special topics on out-of-door life.

Lectures by authorities on nature study.

Reports on radio talks pertaining to nature.

Trips to museums, observatories, parks, and public gardens.

Trips to Zoo's and Zoological Gardens.

Field study of wild flowers.

Make a collection of weed specimens, classify and label them.

Make a collection of cultivated plants. Study conditions for growth.

Make a picture collection of animals common in northern climates; do the same for those in southern climates.

Make a picture collection of birds found in the neighborhood.

Make a collection of moths and butterflies common to the region. Study the life histories, and characteristics of each

Make a study of trees and shrubs found in the community.

Learn how to graft trees and shrubs.

Study the structure of leaves in several more common varieties of plants.

Learn how seeds are scattered and propagated.

Keep the nature study bulletin board supplied with clippings and specimens of nature interest.

Take hikes to the woods to study specimens at first hand.

Make sketches of nature subjects for the scrapbook.

Make a list of birds seen on hikes.

Find material for special days such as Arbor Day etc. to be used at assembly.

Make a study of forestry.

Discuss contributions of the United States Government towards preservation of our forests.

HEALTH CLUB

Aims:

To teach pupils to appreciate the importance of good health which comes from the practice of good health rules and the formation of good health habits.

To learn the proper care of the body.

To take an interest in the health of the community.

Activities:

Make postures illustrating health rules for use in school building.

To keep the health bulletin board supplied with clippings pertaining to health.

To obtain Health Reports from local or state board of health and discuss them. Also to report on interesting articles obtained from the United States Public Health Service in Washington. To give reports on important parts of these.

To get an understanding of the proper disposal of garbage and sewage in the community.

To study method of water distribution in the community.

To have an understanding of how electrical devices aid in making for better health.

To learn the rules of "First Aid", and to practice this for an emergency.

To keep health charts for members of the family and for oneself.

To study milk; contamination of milk; Pasteurization.

To read the biographies of the men and women who contributed to the improvement of health, such as Pasteur, Jenner, Lister

Tyndall,etc.

To study the care of parks, alleys, streets, buildings,etc

To make scrapbooks containing clippings, and pictures illustrating rules of health.

To study the prevention of fires; to study automobile and other accidents.

To study traffic signals and traffic conditions.

To learn something about the storage of inflammable material such as gasoline, kerosene, oily rags, etc.

To study ventilation and moisture as it affects the health.

To learn about the care of the eyes. Also proper lighting for reading.

To learn something about mental health and hygiene.

To be able to care for the sick and the sick-room.

To give "First Aid" demonstrations in the school assembly.

To give Health Plays in the school assembly.

To make visits and give reports on the storage and care of foods by store-keepers.

GARDENING CLUB

Purpose:

To arouse aesthetic sense of beauty by planning gardens and grounds.

To encourage the planning and making of beautiful gardens at home and at school.

To arouse civic pride in the community.

Activities:

Test samples of soil found in the community, and decide what will grow best in each sample.

Make a study of plant foods for garden use.

Make a plan for a small vegetable garden.

Make a plan for a flower garden.

List all the hardy perennials that will grow in the community; do the same for annuals.

Make a list of shrubs that are found in the community in the order in which they bloom placing the earliest flowering first on the list.

Keep a scrapbook containing illustrations of beautiful gardens.

Study landscape gardening.

Visit Botanical gardens and parks.

Make a small vegetable and flower garden.

TREE CLUB

Aims:

To know and appreciate the beauty of trees and the part they play in the scheme of nature.

To be able to identify the trees found in the community.

Activities:

To study the way in which trees are useful to mankind.

To learn methods of planting the more common trees.

To plant trees in the school yard, in the home grounds, and in the country side.

To know what diseases affect trees, and how to protect trees from these.

To make a collection of insects that injure trees. Study methods of exterminating them.

Learn the regulations of planting and caring for trees from the city warden.

To make a list of trees found in the locality.

To arrange the hall assembly for Arbor Day.

To make a field visit to a nearby woodland , and become acquainted with the trees of the forests.

To make a collection of seeds of native trees.

To learn what methods and what efforts toward reforestration are being made in the state.

To make a set of lantern slides of the common varieties of trees.

Make a map showing the location of national forests.

To learn methods of caring for injured trees.

To make a collection of lumber, and to label it.

Wild Flower Club

Aims:

To acquaint pupils with the wild flowers of the region.

To study the necessary conditions for plant growth.

To disseminate knowledge regarding the protection of certain species of wild flowers that are becoming extinct.

To cultivate aesthetic taste in pupils through suggestions regarding tasteful arrangement of plants and flowers used for decorative purposes.

Activities:

Make a collection of wild flowers of the region. Name and classify them.

To visit botanical gardens.

To study plant propagation.

To arrange flowers artistically in containers for use in the school building.

To collect specimens for an herbarium.

To supply flowers for the flower table.

To make a collection of lantern slides of flowers to be used in the assembly hall.

To plant bulbs and seeds in window boxes.

To make a scapbook containing specimens, sketches, or illustrations of wild flowers.

Take field trips in order to study the growth, structure, colorings, of each species.

List of books for use in Science Clubs.

Adams, Joseph H.	Harper's Electricity Book For Boys
" " "	Harper's Machinery Book For Boys.
Adams, Peter	Cork Ships and How To Make Them.
Blanchan, Meltze	Wild Flowers Worth Knowing
Bond, A. Russell	The American Boy's Engineering Book
" " "	With The Men Who Do Things.
Brown, C.L.M.	The Conquest of the Air.
Burgess, Thornton W.	The Burgess Flower Book For Children
Caldwell and Curtis	Introduction to Science
Caldwell and Meier	Open Doors to Science
Chapman, Frank M.	Bird Studies With A Camera
Charnley, Mitchell V.	The Wright Brothers.
Collins, A.Frederick	Wonders of Chemistry
" " "	The Boy's Book of Experiments
" " "	The Boy's Book of Engine Building
" " "	The Boy's Book of Submarines
Collins, Francis A.	The Wireless Man
" " "	The Boy's Book of Modern Aeroplane
Corbin, Thomas W.	Marvels of Mechanical Invention
Dana, Marvin	Chemistry for Beginners
Doubleday, Russell	Stories of Invention
Downing, Elliot Rowland	Our Physical World
Dupuy, William Atherton	Our Animal Friends and Foes.
Eaton, Jeanette	The Story of Light.

Finley and Finley	Wild Animal Pets
Fisher and Fassett	Agriculture For Common Schools
Fraser, Chelsea	Heroes Of The Air
French, Allen	The Beginner's Garden Book
Fullerton, Edith Loring	The Book Of The Home Garden
Grenfell, Wilfred T.	Yourself And Your Body
Griffith, Alice M. M.	The Stars And Their Stories
Hawks, Ellison	Engineering For Boys
Hawksworth, Hallam	A Year In The Wonderland Of Trees
Holway, Hope	The Story Of Water Supply
Hunt, Leslie L.	25 Kites That Fly.
Knox, Thomas W.	The Life Of Robert Fulton and A History Of Steam Navigation
Laimbeer, Richard Harper	Birds I Have Known
Lansing, Marion Florence	Great Moments In Science
Lindburg, Charles A.	We
Massie And Underhill	Wireless Telegraphy and Telephony
Mathews, F. Schuyler	Familiar Trees And Their Leaves
" " "	Familiar Flowers Of Field And Garden
McFee, Inez N.	Stories Of American Invention
Meadowcroft, William H.	The Boy's Life Of Edison
Mitton, G. E.	The Children's Book Of Stars
National Geographic Society Washington, D.C.	The Book Of Birds

Nichols, M. Louise	Science For Boys And Girls
Parkman, Mary R.	Conquests Of Invention
Perry, Frances M.	Four American Inventors.
Quear, Charles L.	School And Home Gardens
Rogers, Julia Ellen	Earth And Sky
Sanford, Albert H.	The Story Of Agriculture In The United States
Shaw, Ellen Eddy	Gardening And Farming
Small, Cassie Paine	How To Know Textiles
Tichenor, Frank A.	Aviation
Thomson, J. Arthur	Everyday Biology
Tower and Lunt	The Science Of Common Things
Trueman and Westell	Every Boy's Book Of Geology
West, James E.	The Lone Scout Of The Sky
Williams, Archibald	How It Is Made
" "	How It Works
" "	The Romance Of Modern Engineering
Wood, Eric	Something To Make

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